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Oklahoma City, OK 73118
Phone: 1-800-SMARTLEVEL (762-7853)

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SMARTLEVEL®

Digital Electronic Level Owner's Manual

IMPORTANT
Read Reset and SuperSet, pages 7-11

SmartLevel® Warranty

One-Year Limited Warranty

If, within one year from the date of original purchase, the SmartLevel Sensor Module or rail(s) fail to function because of defects in materials or workmanship, Macklanburg-Duncan will, at its option, either repair or replace such components provided the original purchaser:

1. Calls 1-800-SMARTLEVEL (762-7853) for a Return Authorization Number. M-D is not able to accept returns without an authorization number clearly visible on the shipping label;
2. Returns the Sensor Module or rail(s) postage-paid and insured to M-D at the address set forth below. M-D is not responsible for any damage incurred to the components while in transit or shipping to M-D;
3. Submits original date and proof of purchase;
4. Includes a brief explanation describing why the Sensor Module or rail(s) are inoperable, or how the component was damaged;
5. Submits $5.00 for each Sensor Module and for each rail to cover return postage and handling. Please enclose the total amount in the form of a check or money order. Do not send cash.
6. Send the materials to:
   Macklanburg-Duncan Service Center
   4411 N. Santa Fe
   Oklahoma City, OK 73118

   Authorization No. ____________________

This warranty does not cover damage resulting from accident, misuse or abuse, water (except rails), tampering, servicing performed or attempted by unauthorized agencies, or units that have been modified in any fashion.

If the components do not perform as warranted herein, the original purchaser's sole remedy will be the repair or replacement of the components as provided above. In no event will M-D be liable for damages, lost revenue, lost wages, lost savings, or any other incidental or consequential damages, domestic or international, rising from the purchase and use or inability to use the components, even if M-D has been advised of the possibility of such damages.

Except as provided herein, M-D makes no warranties, express or implied, including without limitation, the implied warranties of merchantability and fitness for a particular purpose, with respect to the components. All warranties for the components, expressed or implied, are limited to the warranty period set forth above. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights. You may also have other rights, as indicated above, which vary from state to state.

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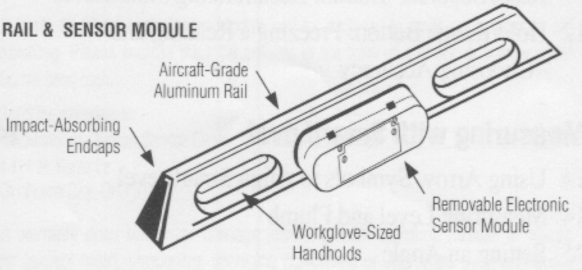
SmartLevel®

Digital Electronic Level

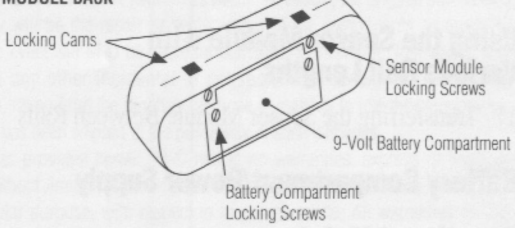
SmartLevel reads all angles through 360° displaying these measurements in four different modes: angle, slope, pitch, and simulated bubble.

In addition, you may select the SmartLevel precision needed for your job, 0.1 or 0.2 degree resolution. And SmartLevel's reset feature allows you to easily recalibrate SmartLevel to original accuracy.

RAIL & SENSOR MODULE

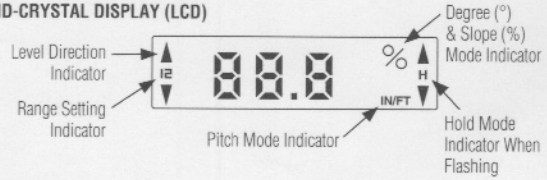


SENSOR MODULE BACK



SENSOR MODULE FACE

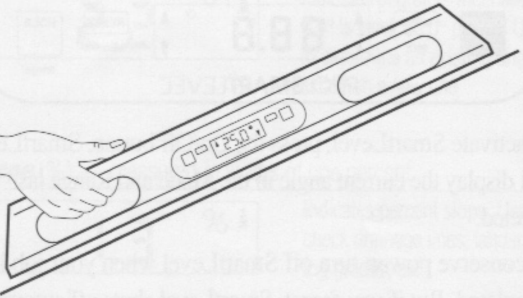
LIQUID-CRYSTAL DISPLAY (LCD)



How to Operate SmartLevel

Measurements with SmartLevel are easy. Simply turn SmartLevel on and:

1. Select the appropriate mode settings by pressing the Mode button.
2. Select the appropriate Range by pressing the Hold and Mode button (Shift-Range) at the same time (see pages 12 and 13).
3. Set the base of SmartLevel upon the surface you wish to measure. The display automatically shows the angle in clear, easy-to-use numbers.
4. Directional arrows on the display indicate which way to move the rail to make it level or plumb.



Notes: The base of SmartLevel module or rails must always be flush against the surface you wish to measure. Tipping or rolling the level will result in an inaccurate measurement.

You also must recalibrate your SmartLevel REGULARLY to maintain its accuracy (see pages 7 - 11).

SmartLevel Features

Selecting SmartLevel Functions

SmartLevel is easy to use. Each button controls the feature that's written on it (ON/OFF, MODE, RESET, and HOLD). In addition, the Mode button works like a shift key to access two other features. Simultaneously press Mode and Hold (Shift-Range) to change Range settings. Or press Mode and Reset (Shift-Superset®) to activate SuperSet. These shift functions are printed on the module just below their respective buttons.

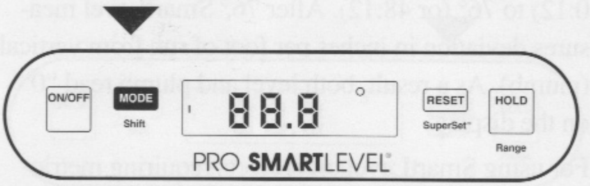
On/Off Button

To activate SmartLevel, press the On/Off button. SmartLevel will display the current angle in the Mode and Range last selected.

To conserve power, turn off SmartLevel when your job is completed. But if you forget, SmartLevel shuts off automatically if it is not jostled or moved within five minutes.

Mode Button

Choosing the Measurement



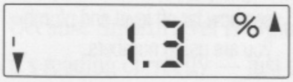
The Mode button is used to select any of four different ways of measuring angles: degrees, slope, pitch and simulated bubble.

When the Mode button is held down, the display will "scroll" through all mode settings.

Degrees (°) — measured in tenths of one degree

Indicates degree of inclination. 0.0° is level; 90.0° plumb. Used to determine an existing angle or establish a new one.

Slope (%) — measured in tenths of one percent

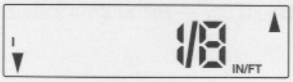


Indicates percent slope. Used to check drainage lines, landscaping grades, etc.

Pitch (IN/FT) — measured in fractions of one inch per foot

Just under 1/4 inch per foot

Just over 1/8 inch per foot



Exactly 1/8 inch per foot

Indicates pitch or inches of rise per foot of run. Used to establish roof pitch, drainage, etc.

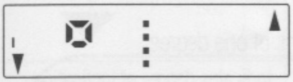
The Pitch mode reads in 1/8 inch per foot increments. Pluses and minuses are used to indicate when the pitch is slightly more (+) or less (-) than the angle shown on the display. The Range setting (accuracy level) does not affect the Pitch mode.

Pitch (continued)

In Pitch mode, SmartLevel measures from level (or 0:12) to 76° (or 48:12). After 76° SmartLevel measures deviation in inches per foot of run from vertical (plumb). As a result, both level and plumb read "0" on the display.

For using SmartLevel on projects requiring metric units, use the % slope mode to measure pitch. The grade of an angle is equivalent to centimeters of rise per meter of run.

Simulated Bubble (⊏:⊐)



Out of level

Closer

Perfectly level

Indicates Sensor Module is nearing level or plumb as bubble moves closer to centerline.

The sensitivity of the bubble's movement on the display is controlled by the Range (accuracy) setting, with "1" being more sensitive than "2." Changing to the Degree(°) Mode will allow you to see how far off level and plumb you are using numbers.

Reset/SuperSet Button

Recalibrating SmartLevel

This button is the key to keeping your SmartLevel accurate. No level can withstand the abuses of a construction site without losing accuracy over time, but with SmartLevel you can recalibrate to factory specs quickly and easily.

There are two procedures that you will use to do this: ***Reset*** and ***SuperSet***.

- **Reset** is a simple "end-for-end" procedure you should use daily before you begin working. It takes less than 30 seconds to perform.

- **SuperSet** recalibrates SmartLevel through its entire 360° range. It's an eight-step procedure that takes just a couple of minutes.

Because SmartlLevel is digital, you can easily determine if it's reading correctly — just compare numbers in a simple "end-for-end" test — not unlike what you do with a bubble level to make sure it's okay.

Use this diagnostic test daily to see if you need to Reset or SuperSet your SmartLevel.

- Lay your SmartLevel on a clean, flat surface. (It doesn't have to be exactly level.) Wait 10 seconds, and note the angle on the display.
- Rotate the level end-for-end so the display is on the opposite side. Be sure and set SmartLevel in exactly the same spot, and allow it to sit for at least 10 seconds before reading the angle again.
- If your measurements vary by more than 0.1°— which can be caused by surface irregularities — you should Reset.

Reset

Reset is a simple 30 second, two-step procedure that should be done once a day, or whenever the module is reinstalled in the rail.

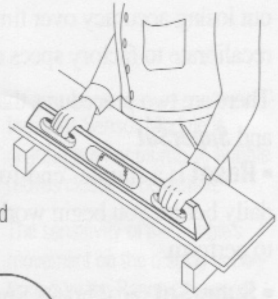
How to Reset

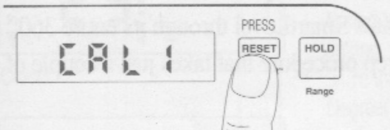
Turn on SmartLevel and place it on a flat surface. The surface doesn't have to be level.

Note: Wait 15 seconds before pressing the Reset button.

Reset — Step 1

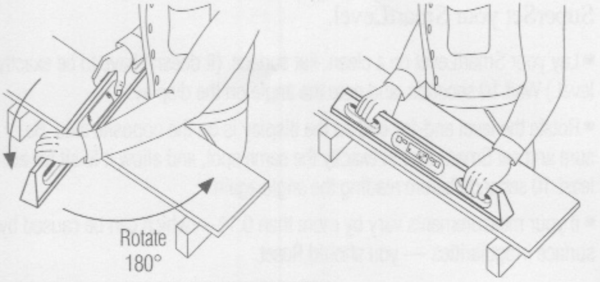
- Sensor Module *faces you*
- Broad base of rail on a flat surface
- Align with an edge or line
- Wait 15 seconds
- Press Reset button, hold until flashing "CAL 1" symbol appears briefly, followed by flashing angle measurement

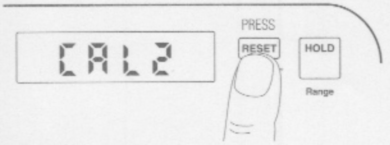




Reset — Step 2

- Rotate SmartLevel 180° so that Sensor Module *faces away from you*
- Align with same edge or line
- Wait 15 seconds
- Press Reset button, hold until "CAL 2" appears





Now that you've Reset your SmartLevel, try the same "end-for-end" in the vertical (plumb) position, making sure to wait at least 10 seconds after inverting the level each time. If these readings are different from each other by more than 0.1°, then you need to SuperSet.

SuperSet

SuperSet recalibrates SmartLevel through its entire 360° range. It is similar to Reset, but is done in four horizontal and four vertical settings. *You should SuperSet your SmartLevel frequently, especially if it's taken a fall, or if you're using it in a very different temperature range from when it was last Superset.*

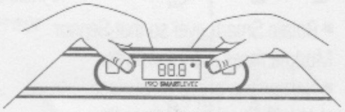
How to Perform SuperSet

Turn on SmartLevel and place it on a flat surface. You can use any horizontal surface within 10° of level and any vertical surface within 10° of plumb to perform SuperSet. You must use the same surfaces throughout the entire process.

Note: Each time you reposition SmartLevel during SuperSet, wait a minimum of **10 seconds** before pressing the Reset button. For optimal accuracy, SuperSet should be performed with the Sensor Module placed within a rail. If a rail is not available, you may perform SuperSet with the Sensor Module alone.

Starting SuperSet

- Press and hold the *Mode* and *Reset* (Shift-Superset) buttons simultaneously.
- Release the buttons when the symbol "SUP" appears. A "0" with flashing brackets will then appear. These brackets are composed of four horizontal and four vertical segments. Note that as you proceed through the eight steps of SuperSet, a new segment will hold steady after you complete each step.



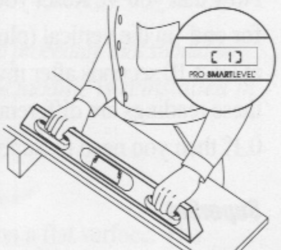
Press Simultaneously

SuperSet Begins

"0" Within Flashing Brackets

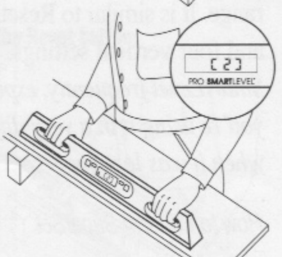
SuperSet — Horizontal Settings

[1]



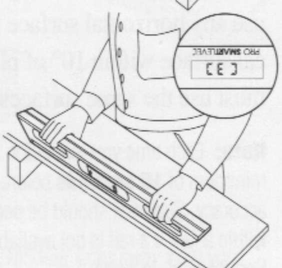
- Sensor Module *faces you*
- Broad base of rail on surface
- Align with an edge or line
- Wait 10 seconds
- Press Reset button until "[1]" appears

[2]



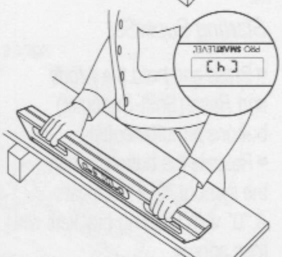
- Rotate SmartLevel so that Sensor Module *faces away from you*
- Broad base of rail on surface
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[2]" appears

[3]



- Flip SmartLevel so that narrow top of the rail is on the surface and Sensor Module *faces you*
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[3]" appears

[4]

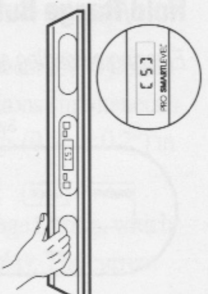


- Rotate SmartLevel so that Sensor Module *faces away from you*
- Narrow top of rail on surface
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[4]" appears

The horizontal settings of SuperSet are now completed.

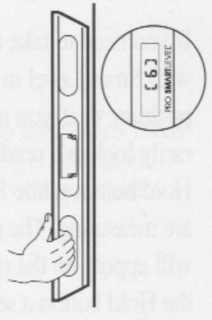
SuperSet — Vertical Settings

[5]



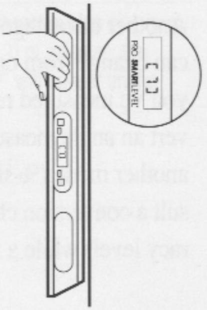
- Place SmartLevel against vertical suface so that Sensor Module *faces you*
- Broad base of rail on surface
- Align with an edge or line
- Wait 10 seconds
- Press Reset button until "[5]" appears

[6]



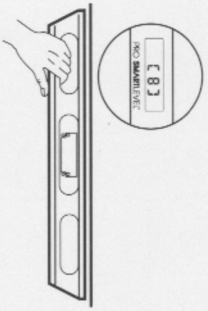
- Flip SmartLevel over so the narrow top of rail is against vertical suface and Sensor Module *faces away from you*
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[6]" appears

[7]



- Rotate SmartLevel end-for-end so the narrow top of rail is against vertical suface and Sensor Module *faces you*
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[7]" appears

[8]



- Flip SmartLevel over so the broad base of rail is against vertical suface and Sensor Module *faces away from you*
- Align with same edge or line
- Wait 10 seconds
- Press Reset button until "[8]" briefly appears followed by regular angle measuring

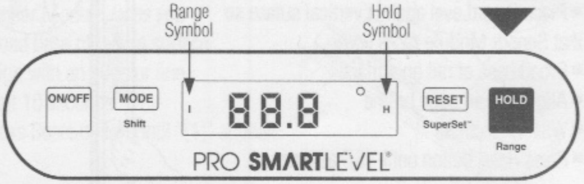
Your SmartLevel has been SuperSet back to factory-perfect accuracy.

Canceling SuperSet

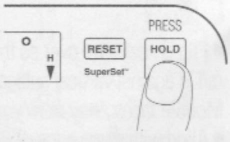
You may cancel SuperSet procedure at any time during the process by turning the unit off.

Hold/Range Button

Freezing a Reading and Choosing Accuracy



Hold—Freezing a Reading



If you need to take a measurement with SmartLevel in an unreadable position, or if you need to temporarily lock in a reading while you record it, simply press the Hold button while SmartLevel is reading the angle that you are measuring. The readout will freeze and a flashing "H" will appear on the right side of the display. To release, press the Hold button a second time.

Another advantage offered by the Hold button is that you can change from one mode to any other while the angle you've measured remains "frozen". This way you can convert an angle measured in one mode (such as degrees) to another mode (% slope or roof pitch) without having to consult a conversion chart. You can also change the range (accuracy level) while a measurement is on hold.

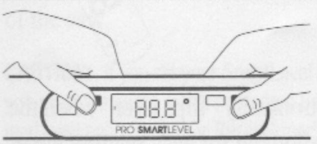
Range—Choosing Accuracy

Different jobs require different levels of accuracy. By pressing the Mode and Hold (Shift-Range) buttons simultaneously, you can select one of two range settings (0.1° or 0.2°) in all but the pitch mode.

Each simultaneous press advances the range setting, which appears on the middle left side of the display. The current range setting is always displayed.

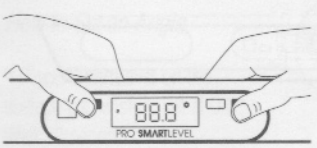
Hold/Range Button & Display

Range "1"



Accurate to within plus or minus (±) 1/10 (.1) of a degree; the symbol "1" will appear on the display

Range "2"

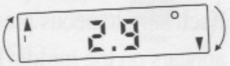


Accurate to within plus or minus (±) 2/10 (.2) of a degree; the symbol "2" will appear on the display

Measuring with SmartLevel

Using Arrow Symbols to Align SmartLevel

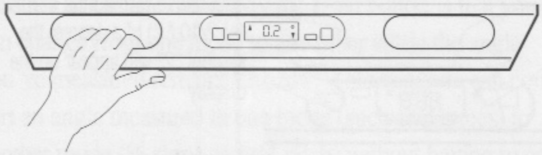
Arrows on the display indicate which way to move SmartLevel to achieve level or plumb.



Between 0° and 44.9°, a pair of arrows in opposite corners of the display will point towards the level position.

Between 45° and 89.9°, the arrows will point towards plumb.

The SmartLevel display electronically "flips over" when the unit is turned upside-down, allowing for easy reading when measuring overhead components.



Measuring Level and Plumb

The following table shows the display readings for each of SmartLevel's four mode settings at 0.0°, 45.0°, and 90.0°:

	Degrees	% Slope	Pitch (IN/FT)	Simulated Bubble
Level	0.0°	0.0%	0.0	
—	45.0°	100%	12	Out of range
Plumb	90.0°	0.0%	0.0	

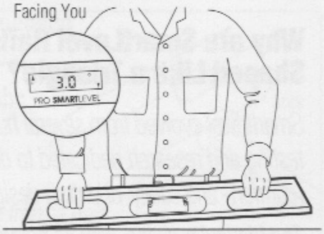
Setting an Angle ("Zeroing" Out)

For some jobs, you may wish to set a particular angle as a reference point from which you can take measurements. For example, you may want a 3° surface displayed as 0° so you can measure all other angles from this benchmark.

A good example is setting the blade angle on a radial-arm saw. You can easily use the SmartLevel module to set the blade *even if the saw table/bed isn't perfectly level.* Just "zero" out the module on the table (set it to read 0.0°), and then use the module to set the blade at the proper angle without having to compensate for the out-of-level condition of the saw.

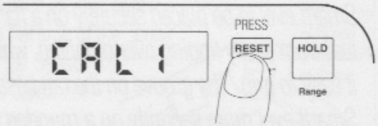
CAUTION: If you set your SmartLevel to read 0.0° when it is **off** level, you must follow the Reset procedure before you can once again accurately read level and plumb (see Reset/SuperSet button, pages 7-11).

With Module Facing You

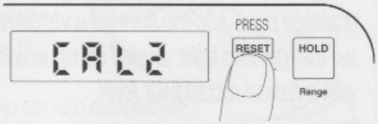


How to Set an Angle

- Place SmartLevel on the surface you wish to set at 0.0°. Wait 10 seconds.
- Press the Reset button until the symbol "CAL1" appears, followed by the angle measurement itself. It will blink on the display.



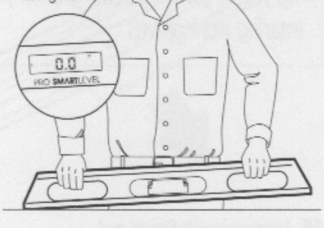
- Do not turn the level 180° as in the Reset procedure, but instead press the Reset button again, until the symbol "CAL2" appears.



That's it!
When the level is on this surface or another at the same angle, it will read "0.0°."

- To reset SmartLevel to true level see pages 7 and 8.

With Module Facing You



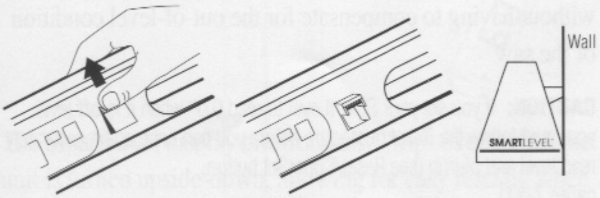
Integrated Wall Stand-Offs

Scribing Lines with SmartLevel

SmartLevel's integrated wall stand-offs stabilize the tool for scribing or measuring lines on vertical surfaces.

To extend the stand-offs, press and slide your thumb over the ribbed portion toward the top of the rail. The stand-offs will pivot out of their nested position.

The bottom surface of SmartLevel can now be easily used to guide a pencil or scribe when drawing or measuring lines.



Why are SmartLevel Rails Shaped Like a Triangle?

SmartLevel evolved from several hundred hours of consumer testing and research dedicated to developing a new ergonomic *(comfort- and safety-oriented) design for SmartLevel.*

The triangular shape, with its broad base and narrow top, permits SmartLevel to be placed securely on a flat surface, preventing the tool from easily tipping over or falling, while its narrow top makes it easy to grip. The groove on the rail base allows you to set SmartLevel more securely on a rounded surface, such as a drainage pipe. And the beveled ends permit you to easily maneuver the tool into tight, angled spots, which would be impossible with a typical rectangular level.

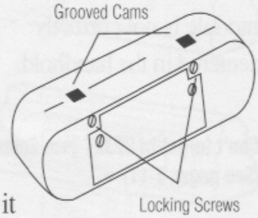
Finally, we added large handholds for the entire rail length, allowing you to get a firm, safe grip on your SmartLevel, even when wearing work gloves.

Using the Sensor Module with Various Rail Lengths

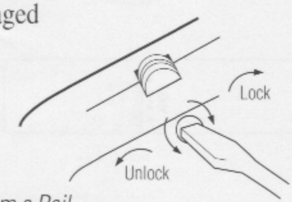
The Sensor Module may be used alone as a torpedo-style level, or it can be transferred and locked into various rail handholds. It fits into any handhold of the 48- and 78-inch rails, but only into the center handhold of the 24-inch rail.

Longer rail lengths provide greater accuracy over longer distances because they "average out" surface imperfections (knots, blisters, bends, bows, etc.).

Transferring the Sensor Module between Rails

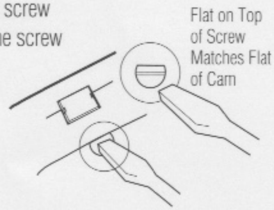


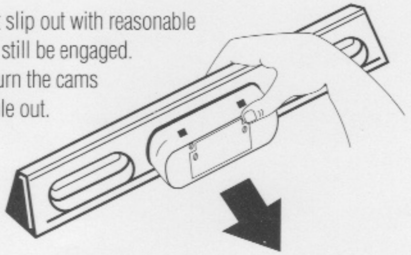
The Sensor Module locks into the handholds via a pair of grooved, self-centering cams, which secure it in the rail. The cams are engaged or released by turning the two locking screws located on the back of the module.



Removing the Sensor Module from a Rail

- Using a screwdriver, turn each locking screw counter-clockwise until the flat side of the screw aligns with the top edge of the Sensor Module. The flat side of the screw corresponds with a flat side of the cam.
- Firmly push the module out of the handhold.
DO NOT FORCE.
- If the module does not slip out with reasonable pressure, the cams may still be engaged. Use the screwdriver to turn the cams while pushing the module out.

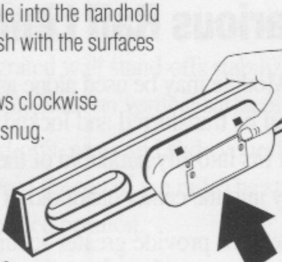




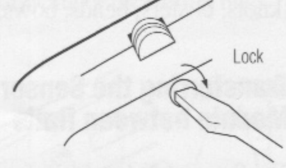
Installing the Sensor Module into a Rail

- Slip the Sensor Module into the handhold until its surfaces are flush with the surfaces of the rail.
- Turn the locking screws clockwise with a screwdriver until snug.

DO NOT FORCE.



Excessive resistance when turning the lock screws indicates the module is not correctly centered in the handhold.



Don't forget to RESET your SmartLevel after reinstalling the module. (See pages 7-11)

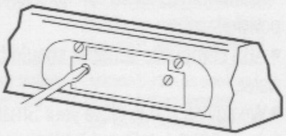
Battery

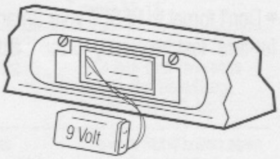
SmartLevel is powered by a standard 9-volt battery. Each new alkaline battery should provide up to 360 hours of continuous use. Lithium batteries will provide even more hours of use.

Installing or Removing Battery

- Unscrew the battery compartment cover screws. The two screws are "captive" and do not separate from the battery compartment cover.
- Remove the cover.
- Install or remove the battery.
- Replace the cover and snug the screws.

DO NOT OVERTIGHTEN.





Low Battery Power Indicator

When the battery is weak, the SmartLevel displays the "Low Battery" warning. Replace the battery when this warning appears.

SmartLevel Maintenance

SmartLevel is designed for the rugged construction environment, and the following tips will ensure that your SmartLevel is kept in top condition.

- The Sensor Module and rails are weather- and water-resistant. Should your SmartLevel be splashed with mortar or other construction site residue, simply wipe clean with a damp cloth.
DO *NOT* IMMERSE THE SENSOR MODULE IN WATER.
- Aluminum surfaces can be cleaned with a non-abrasive cleansing powder.
- ABS composite surfaces should be cleaned with a mild liquid soap and water.
- We advise you to store your SmartLevel away from extreme temperatures below -20°C (-4°F) or higher than 60°C (140°F).
- Don't forget to RESET your SmartLevel daily, and to use the simple "end-for-end" test frequently to see if SUPERSET is required.

QUESTIONS? PROBLEMS?

Feel free to call us at

1-800-SMARTLEVEL

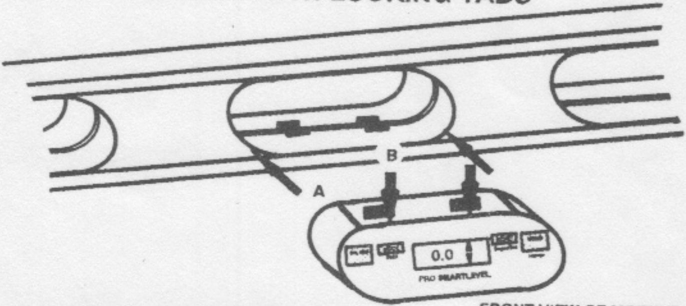
(762-7853)

Troubleshooting Guide

Problem	Reason	Solution
SmartLevel does not turn on.	Battery dead or battery connections are not tight or have become disengaged.	Check battery connections. See Battery, page 19.
SmartLevel does not automatically shut off after five minutes.	Sensor Module is being moved or jostled.	Keep unit stationary for five minutes or more; or turn module off using On/Off button.
SmartLevel does not measure accurately.	SmartLevel has not been recalibrated recently, or has not been recalibrated correctly.	See Reset Button, pages 7-11 and follow appropriate Reset and SuperSet steps closely.
Reset button does not work.	Not pressing Reset button for a sufficient time.	Push Reset button down until the display reading changes. See Reset Button, pages 7-8.
Difficult to select desired mode or range setting.	Mode or Hold/Range button is being pressed too long.	Release button as soon as desired setting appears. See Mode Button, page 5-6; or Hold/Range Button, pages 12-13.
Display reading "jumps" or changes too easily.	SmartLevel is set on a too-sensitive range setting.	Use the Hold/Range button to set a less-sensitive range setting. See Hold/Range Button, pages 12-13.
Display keeps flashing.	The Reset button has accidentally been pressed.	Press the Reset button again or turn SmartLevel off. Repeat the Reset procedure.
Display reads "ERR" or "CAL".	Software diagnostics code	Turn the module off, then on. If display continues to read "ERR" or "CAL", replace battery. If display still continues to read "ERR" or "CAL", call SmartLevel Customer Service at 1-800-762-7853.
Button sticks.	Dirt lodged between button and Sensor Module housing.	Hold module with display facing downward. Press button repeatedly to dislodge dirt.
Module slips out of the rail.	Cams are not turned to properly lock the rail.	See Transferring the Sensor Module between Rails, pages 17-18, and follow the steps closely.
Module cannot be removed or difficult to remove from rail.	Cams are not properly positioned.	See Transferring the Sensor Module between Rails, pages 17-18, and follow the steps closely.
	Dirt lodged between Sensor Module and rail.	Take fine-gauge wire and run it between module and rail to remove dirt.
Battery compartment cover does not come off.	Screws not completely disengaged.	Unscrew more thoroughly. Follow procedures under Battery, page 19.

PRO SMARTLEVEL

MODULE INSTALLATION FOR : 48" AND 78" RAILS WITH LOCKING TABS



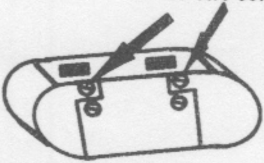
FRONT VIEW OF MODULE

WITH YOUR "RAIL" ON A FLAT SURFACE :

1) POSITION MODULE IN FRONT OF RAIL OPENING AND SLIDE IN UNTIL YOU ENCOUNTER SLIGHT RESISTANCE. PUSH DOWN ON TOP OF MODULE (B) WITH BOTH THUMBS AND SLIDE MODULE INTO THE RAIL UNTIL THE MODULE "CLICKS" INTO THE PROPER OPENING (MODULE WILL BE FLUSH WITH THE SIDES OF THE RAIL).

2) TURN RAIL AROUND SO THE BACK OF THE MODULE IS SHOWN. TURN THE TOP TWO SCREWS ON THE BACK OF THE MODULE CLOCKWISE UNTIL THE MODULE IS SECURED INTO THE RAIL.

TOP TWO SCREWS



BACK VIEW OF MODULE

3) TO REMOVE MODULE , TURN THE SCREWS , COUNTER CLOCKWISE AND PUSH MODULE OUT WHILE APPLYING DOWNWARD PRESSURE AND A SLIGHT "BACK AND FORTH" ROCKING MOTION.

ATTENTION:

SMARTLEVEL® must be SuperSet®
before using for it to read accurately.
(see Owner's Manual)

Questions?
Give us a call at 1-800-SmartLevel (762-7853).
We're here to help.

27-00740-001